

# THE MONKEYS OF THE MACACA NEMESTRINA GROUP.

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The United States National Museum contains seventeen skins of monkeys of the *Macaca*<sup>a</sup> *nemestrina* group, all but one of them collected and presented by Dr. W. L. Abbott. In this series are represented no less than five well characterized species, one each from Sumatra, Borneo, the Pagi Islands, the Malay Peninsula, and Chance Island, Mergui Archipelago. The specimens show no individual variations worthy of special note or which tend in any way to connect the different forms. The species may be distinguished as follows:

## SYNOPSIS OF THE MONKEYS OF THE MACACA NEMESTRINA GROUP.

Hairs of back, underparts, arms, and legs indistinctly or not annulated; median and posterior area of back so dark that the blackish tail forms no noticeable contrast; buttocks not noticeably paler than sides and thighs; canines of males (so far as known) excessively heavy.

A dwarf animal with skull of adult female (male not known) only 110 mm. in greatest length.....*M. pagensis*, p. 557

Large animals with skull of female 130 mm. or more in greatest length, that of adult male 140-160 mm.

Skull elongated, the zygomatic breadth scarcely or not greater than distance from lower rim of orbit to most posterior point of occiput.

*M. nemestrina*, p. 556

Skull widened, the zygomatic breadth considerably greater than distance from lower rim of orbit to most posterior point of occiput.....*M. broca*, p. 558

Hairs of back, underparts, arms, and legs distinctly annulated; median and posterior area of back so little darkened that the blackish tail forms a conspicuous contrast; buttocks noticeably paler than sides and thighs; canines of males not excessively heavy.

A noticeable contrast in length between hair of shoulders and neck and that of back; least distance from orbit to gnathion scarcely greater than width of rostrum at base of zygomata.....*M. insulana*, p. 560

No noticeable contrast in length between hair of shoulders and neck and that of back; least distance from orbit to gnathion conspicuously greater than width of rostrum at base of zygomata.....*M. adusta*, p. 559

<sup>a</sup> *Macaca* Lecépède, Tabl. Mamm., 1799, p. 4. *Macacus* Desmarest, Mammalogie, I, 1820, p. 63.

## MACACA NEMESTRINA (Linnaeus).

1766. [*Simia*] *nemestrina* LINNÆUS, Syst. Nat., 1, 12th ed., p. 35 (Sumatra).

1822. *Simia carpolegus* RAFFLES, Trans. Linn. Soc. London, XIII, p. 243 (Bencoolen, Sumatra).

*Type locality*.—Sumatra.

*Geographic distribution*.—So far as is at present known this species is confined to the island of Sumatra, where it appears to be very generally distributed.

*General characters*.—A large animal with greatest length of skull 130 mm. or more in females, 140–160 mm. in males; zygomatic breadth of skull scarcely or not greater than distance from lower rim of orbit to most posterior point of occiput; fur nowhere distinctly grizzled; a noticeable blackish median dorsal area.

*Color*.—General color a light, dull, russet or wood-brown, fading to ecru-drab on underparts and inner surface of limbs, and becoming blackish on crown, neck, and median area of back. Across shoulders the blackish and brown are distinctly mingled, though without producing any grizzled effect. Long hairs beneath and in front of ear blackish at tip. Tail sharply bicolor; blackish above, dull ochraceous-buff below. Hands and feet not darker than arms and legs. Throughout the brown area of the body and limbs the fur is ecru-drab beneath surface, this color appearing when hairs are disarranged, particularly on sides of body, on lower half of legs, and on hairy portions of buttocks, though nowhere producing contrasted lighter areas. Many of the hairs on arms and legs are dark-tipped, but this is only noticeable on close inspection.

*Skull and teeth*.—Skull (Plate XV, fig. 1) rather elongate, the zygomatic breadth about equal to distance from anterior rim of orbit to most posterior point of occiput, the least distance from orbit to gnathion distinctly greater than breadth of rostrum at anterior base of zygomata; brain case low, the depth from posterior point of frontal to lower edge of occipital condyle very noticeably less than width above posterior base of zygomata; palate highly arched. Canine teeth very large, the greatest diameter of the upper tooth at alveolus about one and one-half times length of crown of third molar; cheek teeth not peculiar in form, but their size relatively somewhat less than in the other species.

*Measurements*.—See tables, pages 561–562.

*Specimens examined*.—Eight, from the following localities: Kateman River, east Sumatra, 4; Tapanuli Bay, west Sumatra, 2; Tarussan Bay, west Sumatra, 2.

## MACACA PAGENSIS Miller.

1903. *Macacus pagensis* MILLER, Smithsonian Miscellaneous Collections, XLV, p. 61. November 6, 1903.

*Type locality*.—South Pagi Island, east Sumatra.

*Geographic distribution*.—This animal is probably confined to the Pagi Islands.

*General characters*.—Like *Macaca nemestrina*, but size much less (skull of female only 110 mm. in greatest length), and color much darker.

*Color*.—Dorsal surface from forehead to base of tail clear bistre, darker than that of Ridgway, the drab underfur appearing irregularly at surface when hair is disarranged. Sides of body and inner surface of arms and legs isabella-color. Belly isabella-color, fading to light fawn-color on chest and throat. Outer surface of arms light russet, that of legs dark isabella-color, except on thighs, which are mostly covered by an extension of the brown area of back. A similar but less extensive wash covers proximal half of upper arm. Sides of neck grayish cream-buff, in striking contrast with upper surface. Cheeks and chin brown like that of back, but not quite as dark. Hands and feet dusky brownish. Tail sprinkled with isabella-colored hairs. "Callosities fleshy brown. Palms and soles light fleshy brown."<sup>a</sup>

*Skull*.—The skull (Plate XVIII, fig. 2) is very much smaller than that of a slightly younger female of *Macaca nemestrina* (Plate XVIII, fig. 1) from Tapanuli Bay, Sumatra. In general form, however, the two do not appreciably differ. The bony palate is concave laterally (when viewed from below), but to a less degree than in the larger animal. Its median line is nearly straight, and shows only a trace of the deep longitudinal concavity so conspicuous in *M. nemestrina* in region between premolars. Audital bullæ a little more swollen anterolaterally than in *M. nemestrina*, but this character may be purely individual. Teeth as in *Macaca nemestrina*, but smaller throughout.

*Measurements*.—See tables, pages 561–562.

*Specimens examined*.—The type of this species remains unique.

*Remarks*.—*Macaca pagensis* is a well-marked insular species characterized by its small size and dark color. The peculiarities of the posterior molars of the type prove to be individual only, as they are exactly reproduced in some of the specimens of *M. nemestrina* now at hand.

<sup>a</sup>Collector's note on label.

## MACACA BROCA, new species.

1893. *Macacus nemestrinus* HOSE, Mammals of Borneo, p. 6. (Not *Simia nemestrina* Linnaeus.)

*Type specimen*.—Adult male (skin and skull) No.  $\frac{19211}{34530}$  United States National Museum. Collected at Sapagaya River, northeast Borneo, November 21, 1887, by C. F. Adams.

*Geographic distribution*.—Borneo.

*General characters*.—Similar to *Macaca nemestrina*, but skull so broadened that zygomatic breadth is considerably greater than distance from lower rim of orbit to most posterior point of occiput.

*Color*.—The color of the type is much like that of *Macaca nemestrina*, except that the brown areas have a dull, drabby cast. This dullness may be due to the fact that the specimen was brought from Borneo in an acid preservative fluid, which may have injured the color. There is no distinct trace of annulation on any part of the fur. Dark dorsal area well developed, extending from forehead to base of tail. In his 'Mammals of Borneo' Mr. Charles Hose describes the color of this animal as follows:

The general color is a decided olive, tending in some animals to brown, the variation in color being due to the relative development of the yellow and black rings on the hair. The rings occur on the exposed portion of the hair, the hidden part of which is gray. The upper surface of the head, the mesial line of the back, and the upper surface of the tail near its base are deep brown or even blackish, more especially on the head and over the hind quarters. The extremities pale toward the hands and feet, which are light olive brown. The outsides of the thighs have an olive-gray tint. Some animals, however, especially the fully grown ones, are almost uniformly colored deep olive brown, except on the blackish head and the middle line of the back. The sides of the face and the under surfaces generally are grayish, tending to white, but on the sides of the face the hair is washed with a dark, almost blackish gray. The face is nude, of a dusky flesh color, which is the tint also pervading the almost naked ears and the callosities.

From this it appears that there is some annulation of the hairs in certain regions, but that it is slight and variable. It is not present to any noticeable degree in any of the three skins that I have examined.

*Skull and teeth*.—The skull differs conspicuously from that of *Macaca nemestrina* in its much greater relative breadth and depth. The zygomatic breadth is conspicuously greater than the distance from anterior rim of orbit to most posterior point of occiput; the distance from orbit to gnathion is not noticeably greater than width of rostrum at anterior base of zygomata, and the depth of brain case from posterior point of frontal to lower edge of occipital condyle is nearly equal to width above posterior roots of zygomata. Palate broader and less highly arched than in *N. nemestrina*. Teeth as in the Sumatran animal, the canines similarly large.

*Measurements*.—See tables, pages 561–562.

*Specimens examined.*—Three, the type in the United States National Museum, and two specimens in the British Museum.

*Remarks.*—This species is readily distinguishable from *Macaca nemestrina* by its much broadened and deepened skull.

MACACA ADUSTA, new species.

*Type specimen.*—Adult male (skin and skull), No. 124023, United States National Museum. Collected at Champang, Tenasserim, December 22, 1903, by Dr. W. L. Abbott. Original number, 2929.

*Geographic distribution.*—Malay Peninsula. Limits of range unknown.

*General characters.*—Like *Macaca nemestrina*, but with hairs of back, underparts, arms, and legs distinctly annulated, median area of back very slightly darkened, and canines of males much less enlarged; least distance from orbit to gnathion conspicuously greater than width of rostrum at base of zygomatica.

*Color.*—The ground color of neck, shoulders, and back is a bright russet, everywhere distinctly speckled by blackish annulations about 3 mm. in length, of which there are from three to five to a hair, according as the fur is longer or shorter. In lumbar region and on uppermost part of thighs the russet fades abruptly to a light ochraceous-buff, which becomes clear and unspckled in area near callosities, forming a noticeable contrast with surrounding parts. Crown blackish. A faint, narrow, blackish shade along middle of back. Tail as in *Macaca nemestrina*, but its dark upper surface strongly contrasted with back. Underparts a light, indefinite drabby gray, distinctly darkened and grizzled across belly. Arms and legs grizzled blackish and drabby gray, with a very slight suffusion of russet, their color noticeably contrasted with that of back. Feet and hands slightly darker than arms and legs.

*Skull and teeth.*—The skull (Plate XIV, fig. 2) is less elongate than that of *Macaca nemestrina*, but not as widened as that of *M. broca*. Bony palate, less arched than in the Sumatran animal. The teeth differ from those of *Macaca nemestrina* in the much less enlargement of the canines in the male, the diameter of the upper tooth at alveolus being about equal to length of crown of posterior molar. The anterior lower premolar has the same peculiarity.

*Measurements.*—For measurements, see tables, pages 561–562.

*Specimens examined.*—Four, from the following localities in Tenasserim: Red Point, 1; Champang, 2; Telok Besar, 1.

## MACACA INSULANA, new species.

*Type specimen*.—Adult male (skin and skull), No. 104441, United States National Museum. Collected on Chance Island, Mergui Archipelago, January 1, 1900, by Dr. W. L. Abbott. Original number, 199.

*General characters*.—Like *Macaca adusta*, but with hair of shoulders noticeably longer than that of back; least distance from orbit to gnathion scarcely greater than width of rostrum at base of zygomata.

*Color*.—The color does not differ appreciably from that of *Macaca adusta*, except that the chest and belly are more heavily grizzled and the hands and feet are noticeably darker than the arms and legs.

*Skull and teeth*.—The skull differs from that of *Macaca adusta* in smaller general size, relatively greater width, and in the shorter rostrum. In fact it suggests a miniature of the Bornean *M. broca*, except that the rostrum is less broad anteriorly. Audital bullæ less inflated than in any of the other forms. Teeth as in *M. adusta*.

*Measurements*.—For measurements, see tables, pages 561–562.

*Specimens examined*.—Three, all from Chance Island.

External measurements of monkeys of the *Macaca nemestrina* group.

| Name.                          | Locality.                      | Date.         | Catalogue No. U.S.N.M. | Sex.            | Total length. | Head and body. | Tail. | Foot. | Weight.                        |
|--------------------------------|--------------------------------|---------------|------------------------|-----------------|---------------|----------------|-------|-------|--------------------------------|
|                                |                                |               |                        |                 | mm.           | mm.            | mm.   | mm.   | Pounds.                        |
| <i>Macaca nemestrina</i> ..... | Sumatra: Kateman River.....    | Aug. 15, 1903 | 123143                 | Male adult..... | 780           | 550            | 230   | 180   | 24 <sup>a</sup>                |
| Do .....                       | .....do .....                  | Aug. 23, 1903 | 123145                 | .....do .....   | 740           | 545            | 195   | 174   | 27                             |
| Do .....                       | Sumatra: Tarussan Bay.....     | Dec. 31, 1904 | 141143                 | .....do .....   | 805           | 590            | 215   | 180   | 30                             |
| Do .....                       | .....do .....                  | .....do ..... | 141144                 | Female adult .. | 700           | 490            | 210   | 155   | 16                             |
| Do .....                       | Sumatra: Tapanuli Bay.....     | Feb. 19, 1902 | 114502                 | .....do .....   | 690           | 480            | 210   | 152   | 10 <sup>3</sup> / <sub>4</sub> |
| <i>Macaca patgensis</i> .....  | Sumatra: South Pagi Island.... | Nov. 17, 1902 | <sup>b</sup> 121653    | .....do .....   | 580           | 435            | 145   | 125   | .....                          |
| <i>Macaca broca</i> .....      | Borneo: Sapagaya River.....    | Nov. 21, 1887 | <sup>b</sup> 34930     | Male adult..... | .....         | .....          | ..... | 175   | .....                          |
| <i>Macaca adusta</i> .....     | Tenasserim: Champang .....     | Dec. 22, 1903 | <sup>b</sup> 124023    | .....do .....   | 785           | 555            | 230   | 163   | 20                             |
| Do .....                       | Tenasserim: Red Point.....     | Feb. 20, 1904 | 124230                 | .....do .....   | 680           | 500            | 180   | 155   | 14                             |
| <i>Macaca insulana</i> .....   | Tenasserim: Chance Island....  | Dec. 30, 1899 | 104439                 | .....do .....   | 685           | 520            | 165   | 147   | .....                          |
| Do .....                       | .....do .....                  | Jan. 1, 1900  | 104440                 | .....do .....   | 666           | 508            | 158   | 148   | 13 <sup>3</sup> / <sub>4</sub> |
| Do .....                       | .....do .....                  | .....do ..... | <sup>b</sup> 104441    | .....do .....   | 697           | 520            | 177   | 143   | 13 <sup>3</sup> / <sub>4</sub> |

<sup>a</sup> Half starved.

<sup>b</sup> Type.



Cranial measurements of monkeys of the *Macaca nemestrina* group.

| Name.                          | Catalogue No., U.S.N.M. | Sex.          | Condylar to basilar length. | Basilar length. | Greatest length. | Palatilar length. | Orbit to gonion. | Front of orbit to posterior point of brain case. | Zygomatic breadth. | Breadth of brain case above roots of zygomatic. | Depth of brain case from posterior extremity of frontal to lower edge of occipital condyle. | Maxillary tooth row (alveoli). | Diameter of upper canine at alveoli. | Crown of last upper molar. | Map-tooth (alveoli). | Mandibular tooth row (alveoli). |
|--------------------------------|-------------------------|---------------|-----------------------------|-----------------|------------------|-------------------|------------------|--|--------------------|---|---|--------------------------------|--------------------------------------|----------------------------|----------------------|---------------------------------|
|                                |                         |               | mm.                         | mm.             | mm.              | mm.               | mm.              | mm.  | mm.                | mm.   | mm.   | mm.                            | mm.                                  | mm.                        | mm.                  | mm.                             |
| <i>Macaca nemestrina</i> ..... | 123143                  | Male adult    | 116.0                       | 108.0           | 154.0            | 63.6              | 66.0             | 99.0   | 93.0               | 67.6  | 56.0  | 49.6                           | 13.0                                 | 9.8                        | 109.0                | 55.0                            |
| Do .....                       | 123145                  | do            | 111.0                       | 103.0           | 151.0            | 60.4              | 65.6             | 98.0   | 96.0               | 68.8  | 62.0  | 47.8                           | 13.0                                 | 8.8                        | 108.6                | 55.4                            |
| Do .....                       | 141143                  | do            | 113.4                       | 105.4           | 154.4            | 64.8              | 66.2             | 100.0  | 103.0              | 72.6  | 62.0  | 49.0                           | 14.0                                 | 9.8                        | 111.0                | 60.0                            |
| Do .....                       | 141144                  | Female adult. | 91.0                        | 82.0            | 130.0            | 48.8              | 49.6             | 89.0   | 82.6               | 69.6  | 58.8  | 41.4                           | 7.2                                  | 8.8                        | 89.0                 | 47.8                            |
| Do .....                       | 114502                  | do            | 96.2                        | 87.0            | 134.4            | 52.6              | 54.0             | 92.6   | 83.8               | 67.8  | 55.0  | 41.4                           | 7.0                                  | 9.7                        | 93.4                 | 46.6                            |
| <i>Macaca pagensis</i> .....   | a 121653                | do            | 77.8                        | 70.0            | 111.0            | 38.0              | 38.6             | 79.0   | 70.8               | 60.6  | 54.0  | 35.8                           | 5.4                                  | 7.8                        | 80.0                 | 40.4                            |
| <i>Macaca brodiaei</i> .....   | a 34980                 | Male adult    | 111.0                       | 100.0           | 145.6            | 60.0              | 59.0             | 96.0   | 104.0              | 71.0  | 63.0  | 47.4                           | 12.4                                 | 9.4                        | 110.4                | 54.4                            |
| <i>Macaca adusta</i> .....     | a 124023                | do            | 104.0                       | 96.0            | 136.0            | 54.0              | 53.8             | 89.6   | 94.0               | 64.4  | 59.0  | 46.8                           | 10.0                                 | 9.6                        | 100.0                | 53.0                            |
| Do .....                       | 124230                  | do            | 98.0                        | 89.0            | 130.0            | 49.4              | 49.0             | 87.6   | 88.0               | 63.0  | 57.8  | 43.0                           | 9.0                                  | 9.8                        | 94.0                 | 49.0                            |
| <i>Macaca insulana</i> .....   | 104439                  | do            | 96.0                        | 88.0            | 128.0            | 50.4              | 52.2             | 86.6   | 94.0               | 65.0  | 53.0  | 41.0                           | 9.4                                  | 8.2                        | 93.6                 | 47.0                            |
| Do .....                       | 104440                  | do            | 93.4                        | 86.0            | 125.4            | 48.4              | 47.6             | 88.4   | 89.6               | 61.2  | 52.0  | 41.0                           | 9.6                                  | 8.8                        | 92.0                 | 48.6                            |
| Do .....                       | a 104441                | do            | 101.0                       | 91.0            | 133.0            | 52.6              | 53.0             | 90.0   | 94.6               | 63.6  | 53.0  | 41.4                           | 10.2                                 | 7.8                        | 97.0                 | 49.4                            |

a Type.



## EXPLANATION OF PLATES.

## PLATE XIII.

(Greatly reduced.)

- Fig. 1. *Macaca nemestrina* (Linnaeus), male, Cat. No. 123143, U.S.N.M., Kateman River, east Sumatra.  
 2. *Macaca adusta* Miller, type.

## PLATE XIV.

(Greatly reduced.)

- Fig. 1. *Macaca nemestrina* (Linnaeus), male, Cat. No. 123143, U.S.N.M., Kateman River, east Sumatra.  
 2. *Macaca adusta* Miller, type.

## PLATE XV.

(Two-thirds natural size.)

- Fig. 1. *Macaca nemestrina* (Linnaeus), male, Cat. No. 123143, U.S.N.M., Kateman River, east Sumatra.  
 2. *Macaca adusta* Miller, type.

## PLATE XVI.

(Two-thirds natural size.)

- Fig. 1. *Macaca nemestrina* (Linnaeus), male, Cat. No. 123143, U.S.N.M., Kateman River, east Sumatra.  
 2. *Macaca adusta* Miller, type.

## PLATE XVII.

(Two-thirds natural size.)

- Fig. 1. *Macaca nemestrina* (Linnaeus), male, Cat. No. 123143, U.S.N.M., Kateman River, east Sumatra.  
 2. *Macaca adusta* Miller, type.

## PLATE XVIII.

(Two-thirds natural size.)

- Fig. 1. *Macaca nemestrina* (Linnaeus), female, Cat. No. 114502, U.S.N.M., Tapanuli Bay, west Sumatra.  
 2. *Macaca pagensis* Miller, type.

## PLATE XIX.

(Two-thirds natural size.)

- Fig. 1. *Macaca nemestrina* (Linnaeus), female, Cat. No. 114502, U.S.N.M., Tapanuli Bay, west Sumatra.  
 2. *Macaca pagensis* Miller, type.

## PLATE XX.

(Two-thirds natural size.)

- Fig. 1. *Macaca nemestrina* (Linnaeus), female, Cat. No. 114502, U.S.N.M., Tapanuli Bay, west Sumatra.  
 2. *Macaca pagensis* Miller, type.